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Division of Mycology and Disease Survey

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BUREAU OF PLANT INDUSTRY

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DIVISION OF MYCOLOGY AND DISEASE SURVEY

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G. R. Townsend reports, page 96, that bean rust is unusually abundant again in southern Florida where it was epiphytotic during the 1935-36 season (see Vol. 20:133-134). Local outbreaks of the disease were reported from several states besides Florida last year (Vol. 20:173, 282, 285, 292, 303, 327, 333).

Brief notes, page 97, include mildew on wheat in Texas by E. S. McFadden, and a reference to an article on cold injury to fruit trees in Pennsylvania, 1935-36.

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A STRIKING EXAMPLE OF VARIETAL RESISTANCE OF ROSES TO CROWN GALL

Frank L. Howard

A striking case of varietal resistance in roses to crown gall (Bacterium tumefaciens) was observed in the greenhouses of one grower at Westerly, Rhode Island. The following varieties are being grown: Better Times, Briarcliff, Talisman, Templar, Double Killarney, Carmelita, Supreme (Premier Supreme, Miss Ellen, Hollywood), Grillo White, Madam Butterfly (and Yellow Madame Butterfly). Of these, Madame Butterfly, and its yellow variation, were badly infected, and a few galls were present on White Grillo. Several thousand two- and three-year old plants were affected. No galls were observed on any of the other varieties. No preventative measures in cutting were being used so there was ample opportunity for dissemination. The galls generally were formed one-half to two inches below where the stem had been cut and the stub had died back to the gall. A "break" usually occurs just below the gall, that is, a new shoot is put out which bears a flower. Then the diseased stem fails to flower further. (Rhode Island Agricultural Experiment Station).

INFECTIOUS HAIRY ROOT ON ROSE

E. M. Hildebrand

On January 20, 1937, a bundle of diseased dormant rose cuttings (Multiflora japonica) were received from a rose nursery in New England. After making isolations from four typical specimens all the cutting were potted to await developments. The hairy-root organism, Phytomonas rhizogenes, was obtained from three of the cuttings: from one having symptoms of an early stage of the disease at the base before roots were produced, from another in the same location having roots, and from a third with similar symptoms appearing on the underground stem at a node. The fourth with a burr-knot type of growth along the stem was negative. Five cultures from each of the positive specimens were inoculated into Kalanchoe diagremontiana to test for pathogenicity and all produced characteristic hairy root symptoms in five weeks. Reisolations from these yielded the bacteria.

After being potted for six weeks the cuttings had leafed out and were reexamined for hairy root symptoms. All but 6 of the 26 plants showed fresh hairy root developments ranging from the early overgrowth stage [1/]

1/ Riker, A. J., and E. M. Hildebrand, Seasonal development of hairy root, crown gall, and wound overgrowth on apple trees in the nursery. Jour. Agr. Res. 48:887-912 1934.

without roots to overgrowths with roots over two inches long. Some cuttings had as many as three or four infections. The majority, or 15 out of the 20 diseased cuttings had infections on the underground stem instead of at the cutting base, all being presumably at wounds produced in preparation for planting.

This appears to be the first report of natural infection by the hairy root organism on rose cuttings. According to the nurserymen these cuttings were grown in Texas and about one-half of the crop showed symptoms. The previous crop grown on the land is not known but presumably was roses. (New York (Cornell) Agricultural Experiment Station).

A SERIOUS BLIGHT OF THE PHILIPPINE LILY CAUSED BY BOTRYTIS ELLIPTICA

Frank L. Howard

A florist of Pawtucket, Rhode Island, has been growing large numbers of the "Philippine" lily, Lilium formosanum, from seed and from bulbs. During this time he has selected a pure white strain and has observed no disease. Suddenly, about September 10, 1936, he noticed that the stalks, foliage leaves, and the sepals of buds and flowers of some 50,000 lilies in one planting grown from seed were covered with oval, reddish-brown spots, and in some cases the leaf and sepal tips also showed necrosis. From the lesions Botrytis elliptica (Berk.) Curt. was repeatedly isolated. Flowers and buds, showing lesions the size of pin points when cut in the field, were covered with large spots after being held 24 hours in the salesroom, making the blooms valueless. Overhead watering had been used subsequent to rain falling on nine of the last twelve days in August while the young flower buds were developing. Apparently the excessive humidity was the major factor in bringing about the epiphytotic and consequent 100 percent loss of the flower crop. No other species of Lilium or closely related plant was growing or had been growing near the field of Philippine lilies, which leaves the source of the inoculum unknown. (Rhode Island Agricultural Experiment Station).

FUSARIUM POAE ON SPRING OATS IN OREGON

Roderick Sprague

Fusarium poae (Pk.) Wollenweber occurs on panicles of spring oats in Hood River and Clatsop Counties, Oregon. The diseased spikelets have a characteristic buff color. All or parts of a panicle may be infected. The infected spikelets are sterile.

The fungus appears to be fairly common in the vicinity of Astoria. It was noted particularly in varieties of oats that were subject to smut (Ustilago levis) and may, in some cases, be a secondary parasite on spikelets sterile because of latent smut infection. At the John Jacob Astor Experiment Station near Astoria this condition was observed in plots of oats, which, although purported to be Markton, had 5 percent smutted plants. These plants also showed a considerable amount of spikelet sterility. All such spikelets were covered with F. poae, which was fruiting abundantly.

Cultures of F. poae produce a tufted, buff growth on potato dextrose agar with an abundant production of the Sporotrichum-like conidia when grown at a temperature of 35-40° F. The cultures were identified by Dr. H. W. Wollenweber as F. poae. (Oregon Agricultural Experiment Station cooperating with the Bureau of Plant Industry, Division of Cereal Crops and Diseases).

EARLY DEVELOPMENT OF THE APPLE SCAB FUNGUS IN MASSACHUSETTS

O. C. Boyd

In 1936, following the rapid disappearance of the snow around the middle of March, perithecia reached maturity unusually early during the mild weather that followed. This year, we have had practically no snow all winter, and perithecia have made some progress during the warmer periods in December, January, and February. Leaves examined today (March 9) indicate still earlier development of perithecia than in 1936. Scabbed leaves that dropped during the first half of October now contain perithecia with asci in all stages from early ascus development up to a small percentage of asci with fully matured spores. Leaves removed from the tree on October 15, as well as leaves that dropped naturally during November show ascogenous hyphae but no asci. Mature spores were first observed last year on March 23. (Massachusetts Agricultural Experiment Station, March 9).

/NOTE: Does this hold true for other regions? Reports will be appreciated./

VERTICILLIUM ON PEACH IN MASSACHUSETTS
A CORRECTION

Malcolm A. McKenzie

Mr. Kenneth F. Aldrich of the U. S. Division of Forest Pathology at New Haven, Connecticut, and Dr. B. A. Rudolph of the University of California Deciduous Fruit Station, San Jose, have very kindly called to the writer's attention the fact that in the Plant Disease Reporter, Volume XXI, Number 3, dated February 15, 1937, on page 58, he reported on diseases of Prunus spp. in Massachusetts as follows:

Prunus spp. Cherries:
Black-knot (Plowrightia morbosa)
Wilt (Verticillium sp.)

The only species of Verticillium found in species of Prunus during the tree disease survey in Massachusetts was the one on peach as described in the context of the report on page 56. So far as is known to the writer Verticillium sp. has never been found on cherries in the United States, although this host is reported in Europe. Therefore, the listing of the diseases on page 58 should be corrected to read as follows:

Prunus spp. Cherries:
Black-knot (Plowrightia morbosa)

Peach:
Wilt (Verticillium sp.)

It is not the intention of the report to decide whether peach is correctly considered as included in the genus Prunus. (Massachusetts Agricultural Experiment Station).

FRUIT DISEASES IN IDAHO, 1936

E. C. Blodgett

The following list of fruit diseases has been compiled from the records of inquiries and of field observations on the occurrence and prevalence of these diseases in Idaho during 1936. Most of the notes were made during the three field trips of June 15-26, September 8-19, and November 3-8. These trips were not strictly of a survey nature, and the following records were taken incidental to other work. Thus, the list is complete only in that it includes all diseases observed during 1936. It is planned to prepare an annual summary for purposes of record and as a guide for research and extension in this field.

Parasitic Diseases

Coryneum Blight of Stone Fruits (Coryneum beijerinckii Oud.):

On peach: This disease was recorded for the first time as being of considerable importance on peach fruits in the Emmett, Huston, and Twin Falls areas of southern Idaho. This occurrence is probably in part a result of the above-normal precipitation. The disease is commonly found in northern Idaho. (May-Sept.).

On Sweet Cherry: Appeared as mild leaf spotting at Lewiston (June).

On Apricot: Slight fruit spotting at Emmett (June). Severe leaf spotting and twig cankering at Myrtle (May-June).

On Wild Cherry, Prunus emarginata (Dougl.) Walp.: Severe leaf spotting and twig cankering at Myrtle (June). This is the first record of the disease on this host in Idaho. 1/

Powdery Mildew of Stone Fruits (Podosphaera spp.):

On Sweet Cherry: Common on current shoots of winter injured trees and on nursery trees at Moscow (July-Sept.).

On Sour Cherry: Very severe infection was noted on all trees observed in Lewiston, near Weiser and Twin Falls. It is believed that this disease accounts in large part for small size of fruit, poor quality, and generally unsatisfactory returns from sour cherry plantings (June-Sept.).

On Peach: A light infection was observed at Twin Falls (Sept.).

Powdery Mildew on Small Fruits (Sphaerotheca spp.):

On Gooseberry (S. mors-uvae (Schw.) Berk. & Curt.): Some injury to canes and fruit was noted near Parma (June).

On Raspberry (S. humuli (DC.) Burr.): Severe infection noted in one planting in Twin Falls (Sept.).

On Strawberry (S. humuli (DC.) Burr.): Infection noted on plants at Moscow (Oct.).

1/ [There is no other record of its occurrence on this host in the Survey files.]

Blight of Pear and Apple (Bacillus amylovorus (Burr.) Trev.):

On Pear: Injury was extremely severe in some orchards in the Huston area and near Boise. Whole plantings were so badly affected that many were later removed. Twig and blossom blight, together with severe canker development on main limbs, made pear blight a very serious disease (June-Nov.).

On Apple: Injury was general and occasionally severe on apples around Moscow and in southern Idaho (June-Nov.).

Crown Gall of Apple and Peach (Bacterium tumefaciens E.F.S. & Town.):

A few infected apple and peach trees were found in nursery stock at Emmett (Nov.).

Hairy Root of Apple (Phytomonas rhizogenes Riker et al.):

A few infected trees were found in nursery stock at Emmett (Nov.).

Crown Gall of Prune (aerial) (Bacterium tumefaciens):

In an orchard near Payette many trees showed aerial gall formations on crown or large branches. The low vigor of the trees indicated that the disease was probably affecting the root system also.

Perennial Canker of Apple (Gloeosporium perennans Zeller & Childs):

Collections were made in the University orchard at Moscow (Oct.).

Peach Leaf Curl (Taphrina deformans (Fckl.) Tul.):

This disease was of less importance than usual in Lewiston. Very severe in an orchard north of Moscow (July).

Alternaria Rot of Apple (Alternaria sp.):

Specimens were collected in scattered plantings in vicinity of Moscow (Oct.).

Non-parasitic Diseases

Winter Injury (Low temperatures in November 1935, February and April 1936):

Common on all tree and small fruits and very severe on sweet cherries. Noted throughout season; general in State. More details may be found in a special report in the Plant Disease Reporter 21:60-64, 1937.

Black End of Pear:

Approximately 75 percent of the fruit affected on one tree near Fruitland (Sept.).

Drought Spot and Gum Spot of Prunes:

Injury very light in 1936. Confined largely to weak trees or branches. Less severe than usual (Aug.-Sept.).

Cracking of Sweet Cherries:

Extremely severe damage in the Lewiston area but less severe in southern Idaho. Immature, green fruit was cracked, exposing the pit (May-June).

Double Fruits:

Twin cherries are fairly common in the Lewiston area. One small apricot tree near Nampa had several pairs of twin fruits (May-June).

Chlorosis of Peach:

Severe chlorosis noted in an orchard near Lewiston. Probably due to excessive sub- and surface-irrigation moisture.

Lime-induced Chlorosis:

Very severe damage was noted on grapes, many kinds of brambles, peaches, cherries, apples, and prunes in areas from Weiser to Idaho Falls. The trouble is increasing in severity and distribution in southern Idaho (June-Sept.).

Jonathan Spot:

One case of considerable injury was noted on Rome Beauty apples from Coeur d' Alene (Oct.).

Hail Injury:

Extensive damage was done to orchards between Weiser and Boise by hail storms during June. Losses were heavy in some orchards, particularly apples.

Frost Bands:

Specimens of apples showing distinct frost band type of injury were sent from Payette (June).

Bitter Pit of Peaches:

Specimens of Lemon Cling peaches showing a bitter pit type of injury were sent in from Oreana in September. About one-third of the fruit on the tree was affected and injury was worse in the shade.

Virus Diseases

Raspberry Mosaic (Types not separated):

Found in nearly every planting visited in southern Idaho. Mild to severe injury. Also noted mosaic on loganberry (June).

Raspberry Leaf Curl (Types not separated):

Several cases of severe curl were noted in plantings between Boise and Wilder (June).

Miscellaneous Diseases - Causes Undetermined

On Strawberry:

1. A very severe disease or combination of diseases affected berry plantings in the following areas: Lewiston, New Meadows, Payette, and Boise. Symptoms are believed similar to those of crinkle. Circumstantial evidence that it spreads rapidly and renders a planting unprofitable in one season. Noted commonly on Dorsett and Fairfax varieties (May-Nov.).

2. "Leaf spotting". Extremely severe leaf spot infection in a strawberry planting near New Meadows. Symptoms are slightly different from those of the Mycosphaerella leaf spot, being smaller and more numerous (Sept.-Nov.).

On French Prune:

One old tree near Weiser appears to be infected by a virus-like trouble. The leaves are small, malformed, and slightly mottled. The tree is non-productive (Sept.).

On Italian Prune:

1. Leaf Curl. Leaves of diseased trees roll upward, become brittle, and show a silvery or bronzed margin. It is generally distributed and severe, being associated with low vigor trees and weak limbs (Sept.).

2. Leaf Spotting. This year there was an extremely severe development of leaf spotting on prunes throughout the State. Two types were found, one with small dark spots on a green leaf, and the other with large blotches on green or yellowed leaves. Observation failed to show whether these symptoms represented stages of development and when they first appeared. The only observations possible this season were made between September 9 and 19. So far as known the large blotch type has not been recorded before in Idaho (Sept.).

On Apricot:

Young Riland trees in an orchard at Lewiston and at Emmett showed a very severe disease appearing first as a silvery color of the foliage and later as necrotic tissue between the leaf veins, finally resulting in death or severely weakening the trees. Deep lesions were found on roots of one of the affected trees (Aug.-Sept.).

On Currant:

A leaf scorch disease caused considerable damage to a planting near Fruitland. It is thought that it might be potash deficiency (Sept.).

On Gooseberry:

A leaf spotting appeared on bushes near Fruitland (Sept.).

On Peach:

1. Several growers near Weiser (Mann's Creek) have become alarmed about the appearance of a trouble in both young and old peach orchards in the past two or three years. More trees are affected and severity of the disease is increasing.

There is no abnormal appearance to the trees until about two weeks before harvest, when the fruit drops and the leaves fall. A single branch, half the tree, or the whole tree may be defoliated in early September or nearly two months before the usual time. The crop is a total loss on affected branches or trees. What appears to be a similar trouble was found in the Sunny Slope district near Houston.

Propagation from these trees was attempted in 1936, but it was found that in one case all 10 buds had died and, furthermore, that the twigs from which the buds were taken were dried out and dead in November. It is possible that some soil condition is the cause, but this seems improbable. The importance of the disease seems to warrant as close a study as is feasible. Correspondence is invited from those who may have ideas as to the cause of this trouble.

2. In a nursery at Emmett were found peach trees showing severe shot-holing, reddish, and purplish coloring of foliage, and generally dull reddish color of bark. There were several varieties represented. In practically all cases these trees were making poor growth. The root system seemed to be normal. Several of the trees were tagged and will be transplanted and observed (Sept.).

A Mottled Leaf Condition of Sweet Cherries:

One Bing and one Napoleon tree in an orchard at Leiston were severely affected with what is thought to be mottle leaf, a virus disease. Diagnosis is not certain (May-Sept.). (Idaho Agricultural Experiment Station).

BEAN RUST IN SOUTHERN FLORIDA

G. R. Townsend

Bean rust (Uromyces phaseoli typica) is prevalent in Southern Florida again this season. The first specimens of rusted beans were obtained in a field near Pompano (Broward County) on December 12, 1936. A few days later specimens were obtained at Belle Glade (Palm Beach County). The age of this material indicated that infections had occurred earlier than at Pompano. Specimens were not obtained from Dade County until the second week of January.

The rust was not observed on beans or native legumes from the end of the spring crop (May 1936) until it appeared last December. Native legume hosts of bean rust are suspected but have not been found. Uredospores are the only spore form found in the course of many observations during two seasons. The problem of determining how and where the fungus passes our summer remains to be solved.

Experimental work in the spring of 1936 gave definite promise of the control of bean rust through the use of sulfur dusts. This work is being continued both in the greenhouse and with field plots. Over 99 percent of the infections on inoculated plants were prevented by the use of a high grade dusting sulfur. Results with wettable sulfur sprays were nearly as good. Copper fungicides were less than 50 percent effective.

Comparative resistance of twelve strains of beans has been studied in a series of inoculation experiments. The reactions of the strains of beans varied from complete susceptibility to actual immunity. The selections studied may be classified as follows:

Immune (Having neither sori nor flecks)
- Kentucky Wonder #6649 - Ferry-Morse
- Kentucky Wonder #6651 - Ferry-Morse

Highly resistant (very few sori; no flecks)
- Kentucky Wonder #6669 - Ferry-Morse
- Kentucky Wonder #6657 - Ferry-Morse

Resistant (Hyper-sensitive?; many flecks; few sori)
- Kentucky Wonder - Associated Seed Growers
- Kentucky Wonder #6658 - Ferry-Morse
- Kentucky Wonder #6659 - Ferry-Morse

Susceptible (many sori; no flecks)
- Bountiful - Associated Seed Growers
- Giant Stringless - Associated Seed Growers
- Tendergreen - Associated Seed Growers
- Bountiful Wax - Associated Seed Growers
- Stringless Black Valentine - Associated Seed Growers

The tolerance to rust of beans in the susceptible group seems to vary under different conditions. Although the five varieties listed as susceptible are killed by rust when inoculated in the greenhouse, it has been observed that Stringless Black Valentine withstands rust in the field much better than Bountiful.

Crosses are being made between the resistant strains of Kentucky Wonder and the susceptible Bountiful. The F_1 of these crosses will be tested this spring. (Everglades Experiment Station, Belle Glade, Florida).

BRIEF NOTES

MILDEW ON WHEAT IN TEXAS: E. S. McFadden, in the Cereal Courier for March 10 (vol. 29, p. 23), reports that in the vicinity of College Station, "None of the cereal rusts have been observed to date, but there is a trace of mildew (Erysiphe graminis) on wheat in places, which appears to have spread from rescue grass, on which it has been carried through the winter."

LOW TEMPERATURE INJURY TO ORCHARDS IN PENNSYLVANIA, 1935-36: This is the title of an article by R. D. Anthony and R. H. Sudds in the American Fruit Grower for January, 1937 (vol. 57, no. 1, pp. 11, 22, 25, 27).

FEBRUARY WEATHER

(From the Weekly Weather and Crop Bulletin for the week ending March 2, 1937.)

The month of February was characterized by moderate temperatures for the season rather generally over the country and wide variations in precipitation. Figure 10 shows that the month was abnormally warm in most of the Lake region and the Northeast, but in other sections east of the Rocky Mountains the mean temperatures were very near normal. In fact, an unusually large number of stations reported approximately normal temperature for the month, and practically everywhere the monthly means ranged from 1° or 2° plus to 1° or 2° minus. West of the Rocky Mountains the averages were moderately low for the season in most of the Great Basin and upper Rocky Mountain sections, but minus departures from normal were rather marked in northern California. Elsewhere, about-normal warmth prevailed in those regions.

Figure 11 shows that precipitation was abnormally heavy in most sections from the Rocky Mountains westward, and also in the more southeastern States and central-northern districts. Elsewhere, the amounts were deficient, with very little over considerable trans-Mississippi areas. The boundaries between sections of comparatively heavy precipitation and others of scanty amounts were sharply drawn in many places. In the far West the relatively heaviest falls occurred in southern California, where the month had more than twice the normal precipitation. Also, in the region just west of the Great Lakes, substantially more than normal occurred, ranging up to above twice the normal locally. Heavy rains occurred in some southeastern States, Tampa, Florida, for example, having more than 4 times the normal for the month.

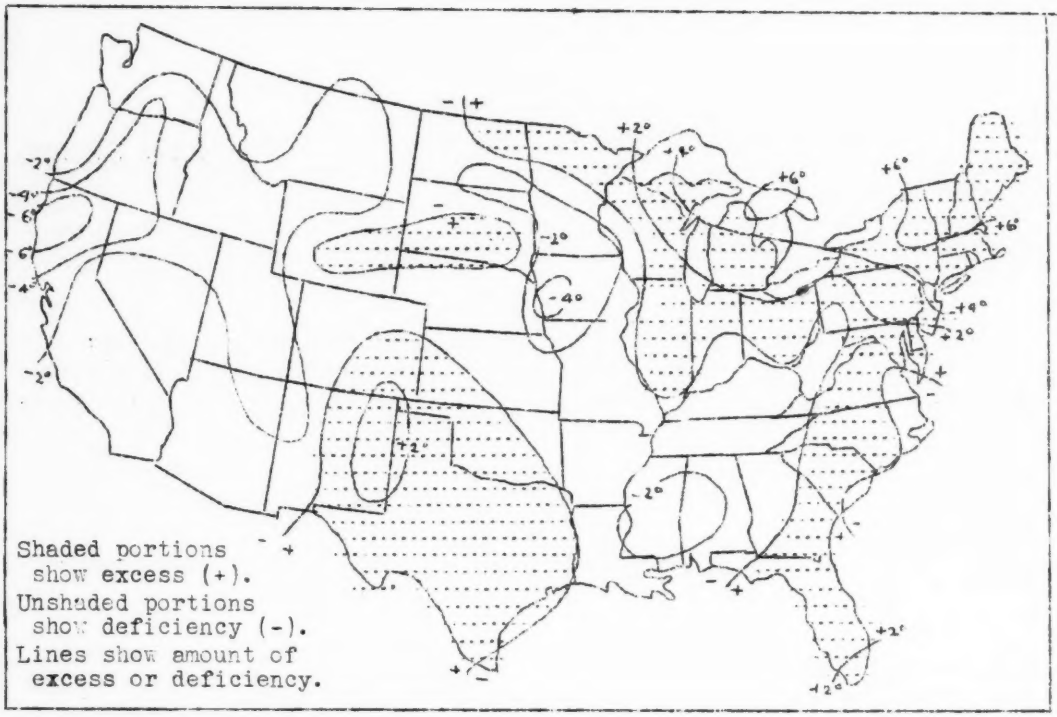

Fig. 10. Departure of Mean Temperature from the Normal for February 1937.

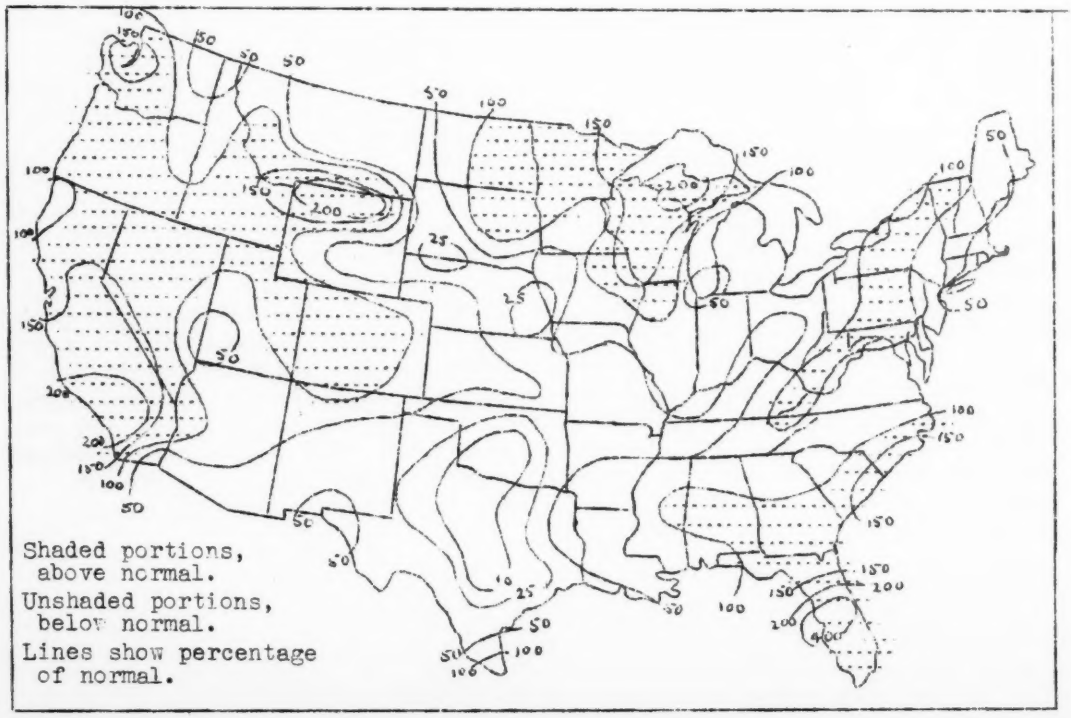

Fig. 11. Percentage of Normal Precipitation for February 1937.

On the other hand, the interior valleys generally were relatively dry. In marked contrast to January, February in the Ohio Valley had only about half the normal rainfall, while a large southwestern area, including Oklahoma and much of Texas, had less than one-fourth the normal. In general, the western Great Plains had decidedly scanty precipitation, with some sections receiving less than one-fourth the normal amount.

For the three winter months ending with February, December and February had generally moderate temperatures, with a tendency to above normal in most sections, while January was decidedly warm in the eastern third of the country, and extremely cold in most of the West and Northwest. December had moderate temperatures to abnormally warm weather for the season in all sections of the country, with the interior States considerably warmer than normal. January was characterized by marked extremes in temperature, being one of the warmest months of record in the Eastern States and extremely cold in the West and Northwest, while February had about-normal warmth in nearly all areas.